

Docket No.: 0033-0892P
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Minehiro KONYA et al.

Application No.: 10/611,871

Confirmation No.: 004164

Filed: July 3, 2003

Art Unit: 2628

For: MOBILE EQUIPMENT WITH THREE
DIMENSIONAL DISPLAY FUNCTION

Examiner: D. F. Hajnik

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on March 27, 2007, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Sharp Kabushiki Kaisha

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 27 claims pending in this application.

B. Current Status of Claims

1. Claims canceled: 1-6, 14, 31
2. Claims withdrawn from consideration but not canceled: NONE
3. Claims pending: 7-13, 15-30, 32-35
4. Claims allowed: NONE
5. Claims rejected: 7-13, 15-30, 32-35

C. Claims On Appeal

The claims on appeal are claims 7-13, 15-30, 32-35

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 7

Embodiments of the present invention covered by claim 7 (e.g., fourth embodiment; present specification at pages 13-15) are directed to mobile equipment (e.g., a mobile phone; Figs. 1, 2A, 2B) comprising:

a single pickup device (e.g., camera 206) picking up an image of a subject;

a parallax information portion determining parallax information of said subject (e.g., processor 105: step 406, “obtains an angle α formed by a line extending between the subject’s face and one eye assumed at the position of the camera and a line extending between the subject’s face and the other eye assumed at the position of the camera”; see Fig. 6) based on a distance between human eyes (specification at page 10, lines 10-16);

a three dimensional image creation portion (e.g., processor 105: step 407, “imparts to three dimensional data the parallax information corresponding to angle α ” to create a 3D image including an image for the right eye and that for the left eye) creating a three dimensional image by applying said parallax information to said image; and

a display unit displaying said three dimensional image (e.g., main screen 203; step S408),

wherein said three dimensional image creation portion cuts a human face out of said image picked up (e.g., processor 105: step 404; Fig. 7A; “the user uses a selection frame 701 displayed on main screen 203 to designate in a 2D image of a human face ...”; or, “using a pen”

tracing and designating a subject to the cut out), to obtain a face image and provides said face image with said parallax information. (specification at page 13, lines 14-30).

Claim 10

Embodiments of the present invention covered by claim 10 are directed to a mobile equipment comprising:

a single pickup device (e.g., camera 206) picking up an image of a subject;

a parallax information portion determining parallax information of said subject (e.g., processor 105: step 406, “obtains an angle α formed by a line extending between the subject’s face and one eye assumed at the position of the camera and a line extending between the subject’s face and the other eye assumed at the position of the camera”; see Fig. 6) based on a distance between human eyes (specification at page 10, lines 10-16);

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image (e.g., processor 105: step 407, “imparts to three dimensional data the parallax information corresponding to angle α ” to create a 3D image including an image for the right eye and that for the left eye); and

a display unit displaying said three dimensional image (e.g., main screen 203; step S408),

wherein said three dimensional image creation portion selects a particular subject from said image picked up, to obtain an image of the subject and provides said image of the subject and an image included in said image picked up other than said particular subject with different parallax information (e.g., frame 701 is used to select a subject to be seen forward; specification at page 14, lines 7-13), respectively.

Claim 13

Embodiments of the present invention covered by claim 13 are directed to a three dimensional conversion program product stored on a computer readable storage medium causing a computer to execute a three dimensional conversion process (e.g., Fig. 4) comprising the steps of:

inputting a two dimensional image (e.g., step S401);

cutting a human face image out of said two dimensional image to obtain a face image (e.g., step 404; Fig. 7A; “the user uses a selection frame 701 displayed on main screen 203 to designate in a 2D image of a human face ...”; or, “using a pen” tracing and designating a subject to the cut out);

determining parallax information of said face image (e.g., step 406: “obtains an angle α formed by a line extending between the subject’s face and one eye assumed at the position of the camera and a line extending between the subject’s face and the other eye assumed at the position of the camera”; see Fig. 6) based on a distance between human eyes (specification at page 10, lines 10-16);

creating a three dimensional image by applying said parallax information to said face image (e.g., step 407: “imparts to three dimensional data the parallax information corresponding to angle α ” to create a 3D image including an image for the right eye and that for the left eye); and

outputting said three dimensional image (e.g., step 408).

Claim 15

Embodiments of the present invention covered by claim 15 are directed to mobile equipment comprising:

a pickup device (e.g., camera 206) picking up an image of a subject;

a parallax information portion (e.g., processor 105) determining parallax information of said subject;

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image (e.g., e.g., processor 105: step 407, “imparts to three dimensional data the parallax information corresponding to angle α ” to create a 3D image including an image for the right eye and that for the left eye); and

a display unit displaying said three dimensional image (e.g., main screen 203; step S408),

wherein said parallax information portion calculates said parallax information based on differences in the brightness between parts of the image (e.g. divide a 2D image into a plurality of blocks and detect each block’s brightness, determine parallax information for each block, at specification, page 12, lines 10-20).

Claim 16

Embodiments of the present invention covered by claim 16 are directed to mobile equipment comprising:

a pickup device (e.g., camera 206) picking up an image of a subject;

a parallax information portion determining parallax information of said subject (e.g., processor 105: step 406, “obtains an angle α formed by a line extending between the subject’s face and one eye assumed at the position of the camera and a line extending between the subject’s face and the other eye assumed at the position of the camera”; see Fig. 6);

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image (e.g., e.g., processor 105: step 407, “imparts to

three dimensional data the parallax information corresponding to angle α' to create a 3D image including an image for the right eye and that for the left eye); and

a display unit displaying said three dimensional image (e.g., main screen 203; step S408), wherein said parallax information portion calculates said parallax information based on the intensity of light reflected from the subject (e.g., detect from intensity of a reflection of the light a distance from the mobile phone to each portion of the subject; present specification at page 12, lines 24-28) and on a distance between human eyes (e.g., the detected distance for each portion of the subject and standard distance between human eyes are used to calculate parallax information, angle α).

Claim 17

Embodiments of the present invention covered by claim 17 are directed to mobile equipment comprising:

a pickup device (e.g., camera 206) picking up a two dimensional image data of a subject;
a three dimensional image creation portion (processor 105) obtaining display data for three dimensional display, the display data including image data for a right eye and for a left eye, wherein said three dimensional image creation portion includes,

a first data process means for generating three dimensional data derived from the two dimensional data (e.g., step S405 - generating a three dimensional model corresponding to each approximate image of a subject in the 2D image based on a texture image pasted on standard face geometry data by parallel projection; as described in the specification at page 8, line 5, to page 10, line 8); and

a second data process means for converting the three dimensional data into the image data for the right eye and the image data for the left eye (e.g., steps S406, S407 - provide the three dimensional data with parallax information, corresponding angle α); and

a display unit (e.g., main screen 204; specification at page 10, lines 26-28) displaying an image for the three dimensional display based on the display data.

Claim 29

Embodiments of the present invention covered by claim 29 are directed to a three dimensional conversion program product causing a computer to execute a three dimensional conversion process (e.g., Fig. 4) comprising the steps of:

receiving an input of a two dimensional image data of a subject (step S401);

obtaining display data for three dimensional display, the display data including image data for a right eye and for a left eye, wherein said step of obtaining the display data includes the steps of:

generating three dimensional data derived from the two dimensional data (e.g., step S405); and

converting the three dimensional data into the image data for the right eye and the image data for the left eye (e.g., step S407); and the process further comprising

outputting the display data (e.g., S408).

Claim 23

Claim 23 is directed to further features of claim 17 of a memory for storing a face geometry model (e.g., memory 106 storing a face geometry model of the owner of the mobile phone), wherein said three dimensional image creation portion further includes an extraction

means for extracting a human face image data out of the two dimensional image data (step S404, each facial part's two dimensional coordinate is obtained and a face image is cut out of the 2D image), wherein said first data process means generates the three dimensional data from the human face image data based on the face geometry model (e.g., when a face image is cut out of the 2D image, processor projects the extracted each facial part's coordinate on a three dimensional human face model to obtain three dimensional data of the entirety of the face image; specification at page 8, lines 5-9).

Claims 32-35

Claim 32 is directed to further features of claim 7 of a memory for storing a face geometry model (e.g., memory 106 storing a face geometry model of the owner of the mobile phone), wherein said three dimensional image creation portion generates three dimensional data (e.g., processor 105 generates three dimensional data of the entirety of the face image; specification at page 8, lines 5-9) from the human face (face image) based on the face geometry model ("face geometry model"), and converts the three dimensional data into the three dimensional image (e.g., step S407, create a 3D image including an image for the right eye and that for the left eye; specification at page 10, lines 18-25).

Claim 33 is directed to further features of claim 10 of a memory for storing a face geometry model (e.g., memory 106 storing a face geometry model of the owner of the mobile phone), wherein said three dimensional image creation portion generates three dimensional data (e.g., processor 105 generates three dimensional data of the entirety of the face image; specification at page 8, lines 5-9) from the selected subject based on the face geometry model (face geometry model), and converts the three dimensional data into the three dimensional image

(e.g., step S407, create a 3D image including an image for the right eye and that for the left eye; specification at page 10, lines 18-25).

Claim 34 is directed to further features of claim 13 of a memory for storing a face geometry model (e.g., memory 106 storing a face geometry model of the owner of the mobile phone), wherein the step of creating a three dimensional image further comprises generating three dimensional data from the human face image (e.g., processor 105 generates three dimensional data of the entirety of the face image; specification at page 8, lines 5-9) based on the face geometry model (face geometry model), and converting the three dimensional data into the three dimensional image (e.g., step S407, create a 3D image including an image for the right eye and that for the left eye; specification at page 10, lines 18-25).

Claim 35 is directed to further features of claim 16 of a memory for storing a face geometry model (e.g., memory 106 storing a face geometry model of the owner of the mobile phone), wherein said three dimensional image creation portion generates three dimensional data from the image of the subject (e.g., processor 105 generates three dimensional data of the entirety of the face image; specification at page 8, lines 5-9) based on the face geometry model (face geometry model), and converts the three dimensional data into the three dimensional image (e.g., step S407, create a 3D image including an image for the right eye and that for the left eye; specification at page 10, lines 18-25).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following rejections made in the Final Office Action mailed December 27, 2006 (Final Office Action) are to be reviewed on appeal.

Rejection of claims 16, 17, 21, 24-26, and 29 under 35 U.S.C. §102(a) as being anticipated by JP 2002-077944 (Shuji).

Rejection of claims 7-13, 22, 27, and 28 under 35 U.S.C. §103(a) as being unpatentable over Shuji in view of U.S. Publication 2002/0054032 (Aoki).

Rejection of claims 15 and 30 under 35 U.S.C. §103(a) as being unpatentable over Shuji in view of U.S. Patent 6,995,762 (Pavlidis).

Rejection of claim 18-20 under §103(a) as being unpatentable over Shuji in view of U.S. Patent 6,940,646 (Taniguchi).

Rejection of claims 32 and 35 under 35 U.S.C. §103(a) as being unpatentable over Shuji in view of U.S. Patent 5,818,463 (Tao).

Rejection of claims 23, 33, and 34 under 35 U.S.C. 103(a) as being unpatentable over Shuji in view of Aoki, and further in view of Tao.

VII. ARGUMENT

The Examiner's Rejection under Shuji fails to Establish Prima Facie Anticipation of Independent claims 16, 17, and 29. In addition, it follows that the Examiner's Rejection under Shuji and Aoki, and Rejection under Shuji and Taniguchi fail to Establish Prima Facie Obviousness of claims 22, 27, 28, and 18-20

1. Argument Summary

The Examiner's reasoning provided in support of the rejection of claims 16, 17, and 29 under 35 U.S.C. 102(a) as being anticipated by Shuji fails to establish *prima facie* anticipation. Specifically, the deficiencies in the rejection are that the rejection alleges that certain claimed features are taught in Shuji that the reference fails to reveal. These deficiencies exist for the rejection of claims 16, 17, 21, 24-26, and 29. These deficiencies apply as well for the rejections of claims 18-20, 22, 27, and 28.

2. Legal Requirements of Prima Facie Anticipation

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. Denied, 468 U.S. 1228 (1984); W.L. Gore and Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. Denied, 469 U.S. 851 (1984).

3. The Rejection fails to Establish Prima Facie Anticipation of Independent Claim 16

Embodiments covered by claim 16 are directed to a mobile equipment, including a “parallax information portion determining parallax information of said subject,” “wherein said parallax information portion calculates said parallax information based on the intensity of light reflected from the subject and on a distance between human eyes,” and “three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image.”

In maintaining the rejection of claim 16, the Examiner alleges that in the Final Office Action, on page 18, the following:

Shuji teaches of generating three-dimensional data by teaching of: “It is characterized by consisting of a 3-dimensional scenography generation means to give different parallax to each part of a photographic subject, and to generate the 3-dimensional scenography of a photographic subject” (paragraph [0010] of English translation). Further, Shuji teaches of determining the parallax in part from the distance between human eyes and distance information by teaching of shifting pixels to create a parallax affect. For “distance between human eyes,” the Examiner relies on an explanation in paragraph 0003 of the English translation.

Shuji in paragraph 0003 states,

“A stereoscopic camera is raised as easiest thing as what displays 3-dimensional scenography. This shows a binocular-vision image by seeing the photograph which is a right eye and took the photograph...which photoed spacing equivalent to the parallax of human being's both eyes with two cameras detached right and left with the right-hand side camera to the photographic subject with the left-hand side camera to the photographic subject by the left eye. The above-mentioned principle is applied, two photography systems equivalent to both eyes are built in one case, and the camera which can photo a binocular-vision image easily is devised.”

It is Appellants' understanding that paragraph 0003 teaches a stereoscopic camera having two cameras that are spaced equivalent to the spacing between a human being's two eyes. The two cameras take two photographs, which constitute a binocular-vision image.

The Examiner further refers to paragraph 0038 of Shuji. According to the English language translation, paragraph 0038 discloses that the amount which the image object for the right eye and for the left eye has a pixel shifted is “according to the distance to a photographic subject by the above-mentioned principle is decided.” The paragraph goes on to indicate that the amount of shift, or magnitude of parallax, is multiplied by a multiplier in order to enable a cubic effect to be emphasized or reduced.

The “above-mentioned principle” indicated in paragraph 0038 is described beginning at paragraph 0032. First a light from a light source 104, which is near the subject, is used to form an image of the reflected light at image sensor 102 and save the image to memory in computer 140 (para. 0033). Next, a light from a light source 105, which is at a further distance from the subject, is used to form an image of the reflected light at image sensor 102 and save the image to memory in computer 140 (para. 0034). In other words, the reflected light image of the light from the farther light source 105 and the reflected light image of the light from the closer light source 104 are independently photoed synchronizing with the change of luminescence of the light source (para. 0035). Provided the two images, distance is computed for every pixel of one of the two images (para. 0036). The one image and distance information are sent to a 3-dimensional scenography generation equipment 141 from computer 140, where image for right eyes and

image for left eyes are generated (e.g., see images 21a to 21e in drawing 2), and those images are displayed on a head-mounted display 120 (para. 0037). In forming the image for left eyes and the image for right eyes, each pixel is shifted to the right and left by an amount according to the distance to the subject (para. 0038).

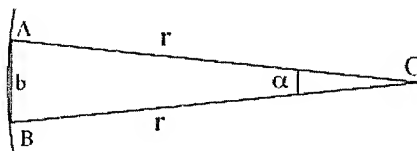
The principle of generating an image for right eyes and an image for left eyes is described with respect to drawing 2. In particular, Shuji teaches shifting pixels corresponding to an object based on the distance between the camera and the object. In the example shown in drawing 2, images are determined as if a camera or cameras 20a to 20e had taken photographs at various positions 21a to 21e. It appears that position 21a corresponds to the actual photograph position, and that position 21b corresponds to an image from the perspective of the right eye and the position 21d corresponds to an image from the perspective of the left eye.

Shuji discloses a much more complex approach to 3-dimensional scenography generation in a computer and for displaying on a head-mounted display than the present invention, which is more suited for use in a Mobile equipment such as a mobile phone. In particular, Appellants submit that although Shuji does appear to form an image for left eyes and an image for right eyes, Shuji does not teach calculation of parallax information based on intensity of light reflected from the subject and on a distance between human eyes, then applying the calculated parallax information to the image to create a three dimensional image.

In the present invention, for example, parallax information (e.g., the parallax angle α) is calculated based on the intensity of light reflected from the subject (see third embodiment beginning at page 12, line 23) and on a distance between human eyes. The calculated parallax information (e.g. parallax angle α) is then imparted to three dimensional data to form the three dimensional image (specification at page 10, lines 8-25).

As is known in the art, the parallax angle α can be determined for an arc (see drawing below, as well as present Fig. 6) given a focal point C. In the case of binocular vision, the length b can be the distance between the centers of a pair of human eyes. In an embodiment of the

present invention, the parallax angle α is calculated based on a distance b between human eyes and a typical distance, e.g., 1 m, between a camera and one's own face (step 406; Specification at page 10, lines 9-23). In an alternative embodiment, the distance is determined from the intensity of reflected light (Third Embodiment, described beginning on page 12, line 23). In the present invention, the distance between the camera and the subject is considered as the distance r to the focal point and is used together with distance b between human eyes to calculate the parallax angle α . (referring to Fig. 6 - see specification at page 10, lines 18-25). In other words, the present invention makes a simplifying assumption that the distance to the subject is the distance to the focal point C , enabling a simple calculation of the parallax angle α based on distance between human eyes.



On the other hand, Shuji teaches a substantially more complex operation of forming the image for left eyes and the image for right eyes by shifting pixels based on the distance information for each pixel in an image, where the distance information is a distance from the camera to the object. In particular, Appellants submit that Shuji does not disclose applying distance between human eyes to determining parallax information.

As noted above, in order to use the distance between human eyes to determine parallax angle α , the distance to focal point C needs to be determined. Appellants submit that Shuji does not disclose calculation of parallax information using a distance to a focal point for binocular vision together with a distance between human eyes.

Appellants submit that the present invention performs a much simpler operation in creation of an image for the left eye and an image for the right eye, than the complex approach

disclosed in Shuji. Appellants submit that the approach disclosed for the present invention is much more suitable for use in Mobile equipment.

Claim 16 specifically recites “wherein said parallax information portion calculates said parallax information based on the intensity of light reflected from the subject and on a distance between human eyes,” and “three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image.”

Appellants submit that Shuji does not teach or suggest determining parallax information based on the distance between human eyes. Furthermore, Appellants submit that Shuji fails to teach at least the claimed features of the three dimensional image creation portion. Based on the above reasons, Appellants submit that the rejection fails to establish *prima facie* anticipation of claim 16. Appellants request that the rejection of claim 16 be reconsidered and withdrawn.

4. The Rejection fails to Establish Prima Facie Anticipation of Independent Claims 17 and 29

Appellants submit that Shuji fails to teach at least the claimed “a first data process means for generating three dimensional data derived from the two dimensional data, and a second data process means for converting the three dimensional data derived from the two dimensional data,” as recited in claim 17.

In maintaining the rejection of claim 17, as well as claim 29 (see page 7 of the Final Office Action), the Examiner alleges that in the Final Office Action, on page 3, the following:

“first data processing means” is taught in paragraph 0010, and in particular by, 3-dimensional scenography generation means to generate the 3-dimensional scenography of a photographic subject, and

“second data processing means” is taught in paragraph 0038, and in particular by, shift a pixel from the image to right and left.

Appellants disagree with the Examiner’s reasoning. According to the English language translation, “the image for right eyes and the image for left eyes are generated by 3-dimensional scenography generation equipment 141 (para. 0037). In other words, the generation of 3-dimensional scenography of a photographic subject includes shifting pixels to the left and right. Paragraph 0038 describes the function performed by the 3-dimensional scenography generation equipment 141.

In the present invention, a first data processing operation includes generating “three dimensional data” derived from two dimensional data, and a second data processing operation includes converting the “three dimensional data” into the “image data for the right eye” and the “image data for the left eye.” In other words, unlike Shuji, the present invention includes an intermediate process of forming three dimensional data, as well as conversion of three dimensional data into image data for the right eye and image data for the left eye.

Appellants submit that Shuji fails to teach at least the claimed “a first data process means for generating three dimensional data derived from the two dimensional data, and a second data process means for converting the three dimensional data derived from the two dimensional data.”

Based on the above reasons, Appellants submit that the rejection fails to establish *prima facie* anticipation of claims 17 and 29. These reasons apply as well to claims 18-22 and 24-28 that depend from claim 17. Appellants request that the rejections of claims 17-22 and 24-29 be reconsidered and withdrawn.

The Examiner’s Rejection under Shuji in view of Aoki fails to Establish Prima Facie Obviousness of Independent claims 7, 10, and 13

5. Argument Summary

The Examiner's reasoning provided in support of the rejection of claims 7, 10, and 13 under 35 U.S.C. 103(a) as being unpatentable over Shuji and Aoki fails to establish *prima facie* obviousness. Specifically, the deficiencies in the rejection are that the rejection alleges that certain claimed features are taught in Shuji and Aoki that the references fail to reveal. These deficiencies exist for the rejection of claims 7-13.

6. Legal Requirements of Prima Facie Obviousness

To establish *prima facie* obviousness, all claim limitations must be taught or suggested by the prior art and the asserted modification or combination of the prior art must be supported by some teaching, suggestion, or motivation in the applied references or in knowledge generally available to one skilled in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). The prior art must suggest the desirability of the modification in order to establish a *prima facie* case of obviousness. *In re Brouwer*, 77 F.3d 422, 425, 37 USPQ2d 1663, 1666 (Fed. Cir. 1995). It can also be said that the prior art must collectively suggest or point to the claimed invention to support a finding of obviousness. *In re Hedges*, 783 F.2d 1038, 1041, 228 USPQ 685, 687 (Fed. Cir. 1986); *In re Ehrreich*, 590 F.2d 902, 908-909, 200 USPQ 504, 510 (C.C.P.A. 1979).

The teaching or suggestion to make the asserted combination or modification of the primary reference must be found in the prior art and cannot be gleaned from applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). In other words, the use of hindsight to reconstruct the claimed invention is impermissible. *Uniroyal Inc. v. Rudlan-Wiley Corp.*, 5 USPQ 1434 (Fed. Cir. 1983).

Finally, when considering the differences between the primary reference and the claimed invention, the question for assessing obviousness is not whether the differences themselves would have been obvious, but instead whether the claimed invention as a whole would have been obvious. *Stratoflex Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983).

7. The Rejection fails to Establish Prima Facie Obviousness of Independent Claims 7, 10, and 13

According to the Final Office Action, the rejection of claim 7 parallels the rejection of claim 17, presumably for specific comparable features. (Final Office Action at page 7, paragraph 4).

In maintaining the rejection of claim 7, the Examiner makes reference to paragraph 0038 in Shuji with regard to the claimed “a parallax information portion determining parallax information of said subject based on a distance between human eyes.” The Examiner further states that, “in order for the pixel shifting between the left and right eye views to occur the system would have to have the parallax information based on the distance between human eyes (i.e. a standard average distance).”

Appellants disagree. As noted above in arguments for claim 16, Shuji teaches a direct correlation between distance to objects and the amount of shift of each pixel, such that each pixel is shifted to the right and left by an amount according to the distance to the corresponding object (Shuji at para. 0038). Shuji’s distance to each object is not disclosed as being a focal point that together with distance between human eyes are used for calculation of parallax information (e.g., parallax angle). Appellants submit that there is no teaching or suggestion of determining parallax information (e.g., parallax angle α) based on distance between human eyes, then creating a three dimensional image by applying the parallax information.

Furthermore, Appellants submit that Shuji fails to teach at least the claimed “parallax information portion determining parallax information of said subject based on a distance between human eyes,” and “three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image.”

Aoki is relied on for teaching cutting out a face image from an image (see Fig. 24). Aoki does not disclose determining parallax information for the face image based on the distance between human eyes, and thus does not make up for the deficiency in Shuji.

Based on the above reasons, Appellants submit that the rejection fails to establish *prima facie* obviousness for claim 7. Appellants request that the rejection of claim 7 be reconsidered and withdrawn.

Claims 10 and 13 also recite the operations of “determining parallax information of said subject (face image) based on distance between human eyes” and “creating a three dimensional image by applying said parallax information to said (face) image.” Thus, arguments above for claim 7 apply as well to claims 10 and 13.

Based on the above reasons, Appellants submit that the rejection fails to establish *prima facie* obviousness of independent claims 7, 10, and 13. These reasons apply as well to dependent claims 8, 9, 11, 12. Thus, Appellants request that the rejection of claims 7-13 be reconsidered and withdrawn.

The Examiner’s Rejection under Shuji in view of Pavlidis fails to Establish Prima Facie Obviousness of Independent claim 15

8. Argument Summary

The Examiner’s reasoning provided in support of the rejection of claim 15 under 35 U.S.C. 103(a) as being unpatentable over Shuji and Pavlidis fails to establish *prima facie* obviousness. Specifically, the deficiencies in the rejection are that the rejection alleges that certain claimed features are taught in Shuji and Pavlidis that the references fail to reveal. These deficiencies exist for the rejection of claims 15 and 30.

9. The Rejection fails to Establish Prima Facie Obviousness of Independent Claim 15

Embodiments covered by claim 15 are directed to a mobile equipment, in which parallax information is calculated “based on differences in brightness between parts of the image.” According to the present specification at page 12, a 2D image picked up through a

camera can be divided into a plurality of blocks, and a brighter block is formed in a more forward position to create and display a 3D image.

In maintaining the rejection of claim 15, the Examiner alleges in the Final Office Action, on page 13, the following:

“Pavlidis teaches the claimed limitation by teaching of capturing a two-[dimensional] image and applying an image analyzer to determine distance information and extract 3D data from the image (col 5, lines 48-56). One of ordinary skill in the art would recognize that this distance information and 3D object extraction is also parallax data because parallax data is related to the distance of objects moving against a background in the image, which the system of Pavlidis can determine through image analysis. Furthermore, the image analysis is performed by analyzing brightness differences between blocks in the image (see figure 11, steps 1120, 1140, 1150, and 1160).”

Appellants disagree with the Examiner’s reasoning. Appellants submit that Pavlidis does not disclose image analysis that determines distance of objects moving against a background in the image. Furthermore, Pavlidis does not disclose image analysis that calculates parallax information based on differences in the brightness between parts of the image.

Column 5, lines 48-56, of Pavlidis discloses that an image analyzer analyzes a captured image, where the image analyzer includes a distance analyzer 50 (distance is camera distance). Distance measurement is described for example in the Abstract, as information about the object extracted from at least one view by utilizing appropriate constraints and measuring a distance between a camera and the object. Pavlidis does not disclose the distance between a camera and the object as being parallax information.

A careful reading of Pavlidis reveals that Figure 11 shows a method of detecting line segments in an image based on brightness. Following the description of Figure 11, Pavlidis states that: “After line segments have been detected, each line segment is associated with the corresponding block that the corresponding block that the segment was extracted from. The association facilitates determining a location of the line segment and an approximate distance

between the segments.” Appellants submit that even if the distance between the camera and object were to be considered as parallax data, as alleged, Pavlidis merely discloses use of differences in brightness for detection of line segments.

Furthermore, Appellants disagree that Pavlidis actually teaches calculation of, e.g., distance to the camera, based on differences in brightness between parts of an image. Instead, Pavlidis merely discloses that the distance to the camera can be measured (e.g. Abstract).

Further with respect to claim 30, Appellants submit that arguments made in the above for claim 16 with respect to the feature “said parallax information of said subject is determined based on a distance between human eyes,” apply as well to claim 30.

Based on the above reasons, Appellants submit that the rejection fails to establish *prima facie* obviousness of independent claim 15. These reasons apply as well to dependent claim 30. Appellants request that the rejection of claims 15 and 30 be reconsidered and withdrawn.

The Examiner’s Rejections under Shuji and Tao fail to Establish Prima Facie Obviousness of Dependent Claims 23 and 32-35

10. Argument Summary

The Examiner’s reasoning provided in support of the rejection of claims 23 and 32-35 U.S.C. 103(a) as being unpatentable over Shuji and Tao, as well as Aoki (claims 23, 33, 34) fails to establish *prima facie* obviousness. Specifically, the deficiencies in the rejection are that the rejection alleges that certain claimed features are taught in Shuji, Aoki, Tao that the references fail to reveal. These deficiencies exist for the rejections of claims 23 and 32-35.

11. The Rejection fails to Establish Prima Facie Obviousness of Dependent Claims 23 and 32-35

Embodiments covered by claim 23 are directed to a memory for storing a face geometry model, wherein said three dimensional image creation portion further includes an

extraction means for extracting a human face image data out of the two dimensional image data, wherein said first data process means generates the three dimensional data from the human face image data based on the face geometry model, according to the specific claimed features.

Claims 32-35 similarly recite the features of generating three dimensional data from a human face/subject based on a face geometry model, and converting the three dimensional data into the three dimensional image.

As discussed above with respect to claim 17, the three dimensional image creation portion of the present invention includes a first data process means for generating “three dimensional data” derived from two dimensional data, and second data process means for converting the three dimensional data into the “image data for the right eye” and the “image data for the left eye.”

In the present specification, both the first data process means and second data process means are disclosed with respect to functions performed by the processor 105 in conjunction with memory 106, the functions of which are disclosed with respect to Figure 4. Functions of the first data process means are disclosed, for example, as steps S402 to S405 (described in the present specification at page 7, line 8, to page 10, line 8). Functions of the second data process means as disclosed, for example, as steps S406 and S407.

Claim 23 recites the features of “a memory for storing a face geometry model,” “human face image data” extracted out of the two dimensional image data,” and generating “three dimensional data from the human face image data based on the face geometry model.” These features are summarized on page 8 of the present specification, which states that,

“At step S404 each facial part’s two dimensional coordinate is obtained and when a face image is cut out of the 2D image taken in step S401 processor 105 then projects the extracted, each facial part’s coordinate on a predetermined, three dimensional human face model to obtain three dimensional data of the entirety of the face image (S405).”

In the Final Office Action, the rejection of claims 23, 33, and 34 refers back to the rejection of claim 32. The rejection relies on Tao for teaching the specific claimed features. Recall that with respect to the claimed “first data process means” of claim 17, the Examiner considered the 3-dimensional scenography generation means of Shuji as teaching the claimed element. Thus, it appears that the Examiner considers that Tao teaches a modification of Shuji’s 3-dimensional scenography generation means.

The Final Office Action relies on Tao only for teaching a face geometry model (Final Office Action at page 16, first five lines) and memory for storing a face geometry model (Final Office Action at page 16, lines 6-10).

The Final Office Action does not provide evidence of, and Appellants submit that none of the cited references teach or suggest, that the claimed first data process means “generates the three dimensional data from the human face image data based on the face geometry model.” Thus, Tao fails to make up for the deficiencies in Shuji.

Furthermore, Appellants submit that one of ordinary skill in the art would not be motivated to modify the teachings in Shuji with teachings in Tao. The Examiner alleges that it would have been obvious to one of ordinary skill in the art to combine Shuji and Tao because Tao would provide a standard and well known method of animating face features on a display where animation can enhance the display and output of Shuji (Final Office Action at page 16). Appellants submit that it may be true that Shuji could be modified to add animation to its display based on teachings in Tao. However, the claimed invention requires a feature of conversion of three dimensional data, which is generated based on a face geometry model, into image data for the right eye and image data for the left eye. Appellants submit that neither Shuji nor Tao disclose conversion of three dimensional data, generated based on the face geometry model, into image data for the right eye and image data for the left eye.

Shuji teaches use of distance information associated with a two-dimensional image in converting an image into a three dimensional scenography image (para. 0010, para. 0030). Shuji

does not teach an intermediate process of generating three dimensional data, then converting the three dimensional data into an image for the right eye and an image for the left eye.

Tao merely discloses an approach to generating a face model. Tao does not teach generation of three dimensional data from two dimensional data, based on a face geometry model and subsequent conversion of the three dimensional data into an image for the right eye and an image for the left eye, as required in the claims as a whole (claim 23 incorporated with claim 17).

The above stated arguments apply as well to claims 32-35.

Based on the above reasons, Appellants submit that the rejections fail to establish *prima facie* obviousness of claim 23. These reasons apply as well to claims 32-35. Appellants request that the rejection of claims 23 and 32-35 be reconsidered and withdrawn.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A do include the amendments filed by Applicant on December 27, 2006.

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/611,871

1-6. (Canceled)

7. Mobile equipment comprising:

a single pickup device picking up an image of a subject;

a parallax information portion determining parallax information of said subject based on a distance between human eyes;

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image; and

a display unit displaying said three dimensional image,

wherein said three dimensional image creation portion cuts a human face out of said image picked up, to obtain a face image and provides said face image with said parallax information.

8. The mobile equipment of claim 7, wherein said pickup device is a pickup device for picking up a two dimensional image.

9. The mobile equipment of claim 8, further comprising:

a communication control portion controlling a communication with another device; and

a transmission and reception portion allowing a call to and from another device.

10. Mobile equipment comprising:

a single pickup device picking up an image of a subject;

a parallax information portion determining parallax information of said subject based on a distance between human eyes;

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image; and

a display unit displaying said three dimensional image,

wherein said three dimensional image creation portion selects a particular subject from said image picked up, to obtain an image of the subject and provides said image of the subject and an image included in said image picked up other than said particular subject with different parallax information, respectively.

11. The mobile equipment of claim 10, wherein said pickup device is a pickup device for picking up a two dimensional image.

12. The mobile equipment of claim 11, further comprising:

a communication control portion controlling a communication with another device; and

a transmission and reception portion allowing a call to and from another device.

13. A three dimensional conversion program product stored on a computer readable storage medium causing a computer to execute a three dimensional conversion process comprising the steps of:

inputting a two dimensional image;
cutting a human face image out of said two dimensional image to obtain a face image;
determining parallax information of said face image based on a distance between human eyes;
creating a three dimensional image by applying said parallax information to said face image; and
outputting said three dimensional image.

14. (Canceled)

15. Mobile equipment comprising:
a pickup device picking up an image of a subject;
a parallax information portion determining parallax information of said subject;
a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image; and
a display unit displaying said three dimensional image,
wherein said parallax information portion calculates said parallax information based on differences in the brightness between parts of the image.

16. Mobile equipment comprising:

a pickup device picking up an image of a subject;

a parallax information portion determining parallax information of said subject;

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image; and

a display unit displaying said three dimensional image,

wherein said parallax information portion calculates said parallax information based on the intensity of light reflected from the subject and on a distance between human eyes.

17. Mobile equipment comprising:

a pickup device picking up a two dimensional image data of a subject;

a three dimensional image creation portion obtaining display data for three dimensional display, the display data including image data for a right eye and for a left eye, wherein said three dimensional image creation portion includes,

a first data process means for generating three dimensional data derived from the two dimensional data; and

a second data process means for converting the three dimensional data into the image data for the right eye and the image data for the left eye; and

a display unit displaying an image for the three dimensional display based on the display data.

18. The mobile equipment of claim 17, wherein said display unit includes a switching liquid crystal element switchable in deflection angle, and a patterned phase difference plate patterned in a slit;

said mobile equipment further comprising a controlling portion to change a relationship of said liquid crystal element phase and said phase difference plate.

19. The mobile equipment of claim 18, wherein said display unit further includes a liquid crystal including a plurality of pixels and said controlling portion changes the relationship to prevent an image for the three dimensional display from passing through the pixels.

20. The mobile equipment of claim 18, further comprising operation keys receiving an input, wherein said controlling portion changes the relationship based on the input.

21. The mobile equipment of claim 17, wherein said pickup device is a single pickup device.

22. The mobile equipment of claim 17, further comprising
a communication control portion controlling a communication with another device; and
a transmission and reception portion allowing a call to and from another device.

23. The mobile equipment of claim 17, further comprising

a memory for storing a face geometry model, wherein said three dimensional image creation portion further includes an extraction means for extracting a human face image data out of the two dimensional image data, wherein said first data process means generates the three dimensional data from the human face image data based on the face geometry model.

24. The mobile equipment of claim 17, further comprising a three dimensional shutter button to pick up the two dimensional image data, wherein said three dimensional image creation portion obtains the display data in response to press of said three dimensional shutter button.

25. The mobile equipment of claim 17, further comprising
a dividing portion for dividing the two dimensional image data picked up by said pickup device into a plurality of blocks; and

a detecting portion for detecting the brightness of each of said plurality of blocks, wherein
said three dimensional image creation portion generates the display data in response to the brightness of each of said plurality of blocks.

26. The mobile equipment of claim 17, further comprising
a radiation unit illuminating the subject with light; and
a detection portion detecting the intensity of the light,
wherein said three dimensional image creation portion obtains the display data in response to the intensity of the light.

27. The mobile equipment of claim 17, further comprising operation keys for receiving an input for selection of a subject from the background in the two dimensional image displayed on said display unit, wherein

said three dimensional image creation portion further includes a selection data process means for generating the two dimensional image data of the subject in response to the selection.

28. The mobile equipment of claim 27, wherein said operation keys receive inputs for the selection of a plurality of subjects and said selection data process means generates the two dimensional image data for each of the selected subjects.

29. A three dimensional conversion program product causing a computer to execute a three dimensional conversion process comprising the steps of:

receiving an input of a two dimensional image data of a subject;

obtaining display data for three dimensional display, the display data including image data for a right eye and for a left eye, wherein said step of obtaining the display data includes the steps of:

generating three dimensional data derived from the two dimensional data; and

converting the three dimensional data into the image data for the right eye and the image data for the left eye; and the process further comprising

outputting the display data.

30. The mobile equipment of claim 15, wherein said parallax information of said subject is determined based on a distance between human eyes.

31. (Canceled)

32. The mobile equipment of claim 7, further comprising
a memory for storing a face geometry model, wherein said three dimensional image creation portion generates three dimensional data from the human face based on the face geometry model, and converts the three dimensional data into the three dimensional image.

33. The mobile equipment of claim 10, further comprising
a memory for storing a face geometry model, wherein said three dimensional image creation portion generates three dimensional data from the selected subject based on the face geometry model, and converts the three dimensional data into the three dimensional image.

34. The mobile equipment of claim 13, further comprising
a memory for storing a face geometry model, wherein the step of creating a three dimensional image further comprises generating three dimensional data from the human face image based on the face geometry model, and converting the three dimensional data into the three dimensional image.

35. The mobile equipment of claim 16, further comprising

a memory for storing a face geometry model, wherein said three dimensional image creation portion generates three dimensional data from the image of the subject based on the face geometry model, and converts the three dimensional data into the three dimensional image.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.